

Having thus defined the invention, the following is claimed:

1. An electric arc welder for creating a succession of AC waveforms between an electrode and workpiece by a power source comprising an high frequency switching device for creating individual waveforms in said succession of waveforms, each of said individual waveforms having a profile determined by the magnitude of each of a large number of short current pulses generated at a frequency of at least 18 kHz by a pulse width modulator with the magnitude of said current pulses controlled by a wave shaper and the polarity of any portion of said individual waveforms determined by the data of a polarity signal, a profile control network for establishing the general profile of an individual waveform by setting more than one profile parameter of an individual waveform, said parameters selected from the class consisting of frequency, duty cycle, up ramp rate and down ramp rate and a magnitude circuit for adjusting the individual waveform to set total current, voltage and/or power without substantially affecting the general fixed profile.

2. An electric arc welder as defined in claim 1 wherein said magnitude circuit has a first section for adjusting said individual waveform during the positive polarity of said one waveform and a second section for adjusting said individual waveform during the negative polarity of said AC waveform.

3. An electric arc welder as defined in claim 2 including a device for selecting current, voltage or power in said first section of said magnitude circuit.

4. An electric arc welder as defined in claim 3 including a device for selecting current, voltage or power in said second section of said magnitude circuit.

5. An electric arc welder as defined in claim 2 including a device for selecting current, voltage or power in said second section of said magnitude circuit.

6. An electric arc welder as defined in claim 5 wherein said profile control network sets at least three of said profile parameters.

7. An electric arc welder as defined in claim 4 wherein said profile control network sets at least three of said profile parameters.

8. An electric arc welder as defined in claim 3 wherein said profile control network sets at least three of said profile parameters.

9. An electric arc welder as defined in claim 2 wherein said profile control network sets at least three of said profile parameters.

10. An electric arc welder as defined in claim 1 wherein said profile control network sets at least three of said profile parameters.

11. An electric arc welder as defined in claim 5 wherein said profile control network set all four of said named profile parameters.

12. An electric arc welder as defined in claim 4 wherein said profile control network set all four of said named profile parameters.

13. An electric arc welder as defined in claim 3 wherein said profile control network set all four of said named profile parameters.

14. An electric arc welder as defined in claim 2 wherein said profile control network set all four of said named profile parameters.

15. An electric arc welder as defined in claim 1 wherein said profile control network set all four of said named profile parameters.

16. A method of electric arc welding by creating a succession of AC waveforms between an electrode and workpiece by a power source comprising an high frequency switching device for creating individual waveforms in said succession of waveforms, each of said individual waveforms having a profile determined by the magnitude of each of a large number of short current pulses generated at a frequency of at least 18 kHz by a pulse width modulator with the magnitude of said current pulses controlled by a wave shaper, said method comprising:

5

(a) determining the polarity of any portion of said individual waveforms by the data of a polarity signal;

(b) establishing the general profile of an individual waveform by setting more than one profile parameter of an individual waveform, said parameters selected from the class consisting of frequency, duty cycle, up ramp rate and down ramp rate; and,

(c) adjusting the waveform profile to set total magnitude of current, voltage and/or power without substantially changing the general profile.

17. A method as defined in claim 16 including the acts of:

(d) adjusting the magnitude of said individual waveform during the positive polarity of said AC waveform; and,

(e) adjusting the magnitude of said individual waveform during the negative polarity of said AC waveform.

18. A method as defined in claim 17 including the act of:

(f) selecting current, voltage or power for magnitude control during said positive polarity.

19. A method as defined in claim 17 including the act of:

(g) selecting current, voltage or power for magnitude control during said negative polarity.

20. A method as defined in claim 16 including the act of:

(d) adjusting the magnitude of said individual waveform during the positive polarity of said AC waveform.

21. A method as defined in claim 16 including the act of:

(d) adjusting the magnitude of said individual waveform during the negative polarity of said AC waveform.

22. An electric arc welder for creating a succession of AC waveforms between an electrode and a workpiece by a power source comprising an high frequency switching device for creating individual waveforms in said succession of waveforms, each of said individual waveforms having a profile determined by the magnitude of each of a large number of short current pulses generated at a frequency of at least 18 kHz by a pulse width modulator with the magnitude of said current pulses controlled by a wave shaper and the polarity of any portion of said individual waveform determined by the data of a polarity signal, and a magnitude circuit for adjusting the individual waveform to a set condition of current, voltage or power.

23. An electric arc welder as defined in claim 22 wherein said magnitude circuit includes an input selector to set said magnitude circuit to a desired polarity.

24. An electric arc welder as defined in claim 23 including a profile control network to control the general profile of said individual waveform.

25. An electric arc welder as defined in claim 24 wherein said profile control network controls more than one profile parameter of an individual waveform profile, said parameters selected from the class consisting of frequency, duty cycle up ramp rate and down ramp rate.

26. An electric arc welder as defined in claim 22 including a profile control network to control the general profile of said individual waveform.

27. An electric arc welder as defined in claim 26 wherein said profile control network controls more than one profile parameter of an individual waveform profile, said parameters selected from the class consisting of frequency, duty cycle up ramp rate and down ramp rate.

28. An electric arc welder for creating a succession of AC waveforms between an electrode and a workpiece by a power source comprising an high frequency switching device for creating individual waveforms in said succession of waveforms, each of said individual waveforms having a profile determined by the magnitude of each of a large number of short current pulses generated at a frequency of at least 18 kHz by a pulse width modulator with the magnitude of said current pulses controlled by a wave shaper and the polarity of any portion of said individual waveform determined by the data of a polarity signal, and a profile control network to control the general profile of said individual waveform.